THE MEDIPIX DETECTOR IN MAMMOGRAPHY

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INTRODUCTION: The Medipix2 chip is a photon counting X-ray detector, which was developed by the Medipix Collaboration [1] at the European Centre for Nuclear Research (CERN). It consists of a 700µm silicon detector layer with 256×256 square pixels of 55µm size (Fig.1) which is bump bonded to an equally dimensioned pixel read-out chip [2]. The chip is suitable for mammographic applications due to the high absorption efficiency of silicon at the low kV values involved. This initial study compares Medipix lumpectomy images with those acquired using conventional mammographic screen-film techniques.

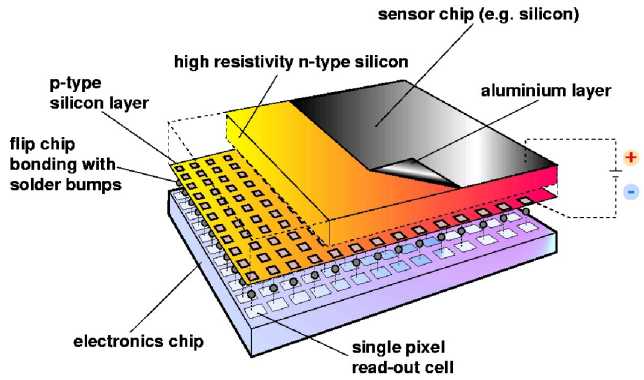

Fig. 1: Schematic of the Medipix2 detector.

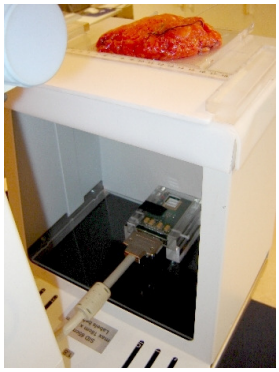

Fig.2: Detector inside magnification table.

METHODS: The detector sits in a mammography magnification table above the film housing (Fig. 2), with lumpectomy translation used to build up tiled images. Images are acquired using the same exposures as for the clinical film/screen images.

RESULTS: Figure 3 shows a film/screen image (left) and a Medipix image (right) of the same breast lesion. The Medipix image was tiled from several sub-images and tiling artifacts are apparent. Similar images of lumpectomies with calcifications have also been acquired.

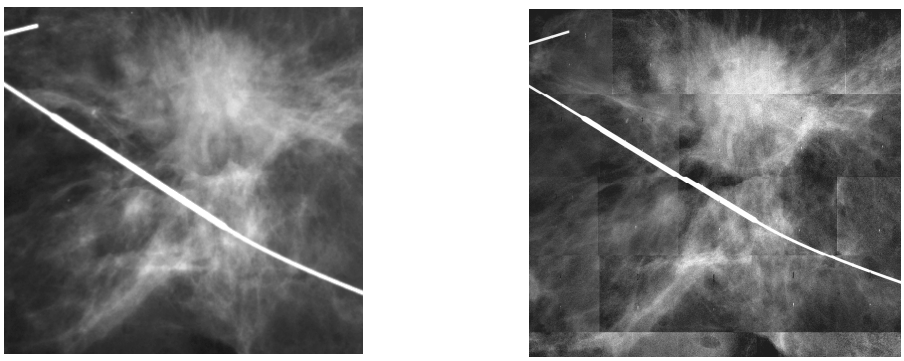

Fig. 3:Breast lesion images acquired with film/screen (left) and Medipix (right).

DISCUSSION & CONCLUSIONS: We have shown that breast lumpectomies containing lesions and calcifications can be successfully imaged using Medipix. Other collaboration members have performed rigorous image quality measurements to show that Medipix is suitable for mammography. The prototype Medipix3 detector achieves improved quality and efficiency, which will allow us to develop a low dose mammography system.

REFERENCES:

[1] http://medipix.web.cern.ch/MEDIPIX/

[2] K.F.G.Pfeiffer, J.Giersch, G.Anton, (2004), *Nuc Intsr Meth Phys Res A, 531: 246-250*